

End-Stage Renal Disease Is a Serious Complication of Diabetes

Kidney disease is a known complication of diabetes. Diabetic kidney disease occurs in 20 and 40 percent of patients with diabetes and is the leading cause of End Stage Renal Disease (ESRD).¹ Among people with diabetes in Utah, there are between 160 and 200 new cases of ESRD every year.²

The basic function of the kidneys is to filter waste products from the blood. If blood glucose levels are too high, the kidneys must work harder to maintain the necessary filtering processes. The extra force required may cause the capillaries in the kidneys to leak, allowing protein to be lost in the urine. Eventually, the kidneys may lose their ability to function, and waste products will build up in the blood. Eventually, end stage renal disease (ESRD) develops, requiring dialysis or a transplant.¹

Early detection of kidney problems is essential. In its earlier stages, kidney disease may go unnoticed. Indications may include:

- High blood pressure
- Swollen feet and ankles
- Leg cramps, especially at night
- Weakness, paleness, anemia
- Dry, itchy skin
- Abnormal blood tests (e.g., blood urea nitrogen [BUN] and creatinine tests)
- A need to urinate more often, especially at night.³

Risk Factors

A number of factors, both modifiable and unmodifiable, contribute to the risk of kidney disease among people with diabetes.

The two predominant modifiable risk factors for kidney disease are high blood glucose and high blood pressure. The two well known landmark studies, the Diabetes Control and Complications Trial (DCCT) and the United Kingdom Prospective Diabetes Study (UKPDS), have demonstrated that tight blood glucose control can significantly reduce the risk of kidney disease in people with both type 1 and type 2 diabetes.⁴ Similarly, blood pressure control should be especially stringent in people with who have or are at risk of developing kidney disease. The Joint National Committee (JNC-7) guidelines recommend a target blood pressure of less than 130/80 mm Hg in patients with chronic

¹ American Diabetes Association, Kidney Disease, and Diabetes Facts and Information
<http://www.diabetes.org/type1-diabetes/kidney-disease.jsp>; See also
http://www.analyticaintl.com/homepage/IHEA_2003_poster.pdf

² Intermountain End Stage Renal Disease Network (Network 15) Denver, Colorado (Annual Reports: 1999-2003). <http://www.esrdnet15.org>

³ Adapted from National Kidney Foundation, "More Facts About Diabetes,"
<http://www.kidney.org/general/aboutdisease.diab.cfm>

⁴ American Diabetes Association *Diabetes Care* 28:S4-S36, 2005
http://care.diabetesjournals.org/cgi/content/full/28/suppl_1/s4

kidney disease.⁵ Lifestyle interventions, such as diet management (e.g., protein restriction) and exercise, as well as clinical interventions (e.g., glycemic control, hypertension control, ACE inhibitors) may reduce the risk of ESRD.⁶

Unmodifiable risk factors include age, family history of kidney disease, and being a member of a racial or ethnic minority group. Among people with diabetes, incidence of ESRD is four times as high in African Americans, four to six times among Mexican Americans, and a striking six times as high in Native Americans.¹

There is also some evidence that people with type 1 diabetes have a higher risk of kidney disease, as much as 12 times that for people with type 2 diabetes.⁷ At least one-fourth of people with type 1 diabetes will develop kidney disease.⁸ In contrast, a number of studies show that only between five to ten percent of people with type 2 diabetes develop kidney disease. However, the prevalence of kidney disease among people with type 2 diabetes appears to be increasing. Innovative treatments in cardiology have increased the longevity of people with type 2, decreasing their chances of suffering from coronary artery disease or other cardiovascular condition, but in turn, increasing their opportunity to develop kidney disease.

Recommendations

The American Diabetes Association recommends people who have had type 1 diabetes for five or more years have an annual test for the presence of microalbuminuria. This test should be conducted annually for people with type 2 diabetes starting at the time of diagnosis and during pregnancy.⁹ Screening for incipient nephropathy is one of the more common methods used in detecting kidney disease at its earliest stages.¹⁰ Persistent microalbumin levels between 30 and 200 mg per 24 hours seen in people with type 1 diabetes suggest they are in the earliest stages of kidney disease. Similar levels seen in people with type 2 diabetes should be considered a warning that kidney disease is developing.¹ Once a person has microalbumin levels higher than 300 mg per 24 hours, he or she is considered to have chronic kidney disease.¹¹

⁵ Seventh Report of the Joint National Committee on Prevention, Detection, Evaluation, & Treatment of High Blood Pressure <http://www.nhlbi.nih.gov/guidelines/hypertension/jncintro.htm>

⁶ Utah Diabetes Management Handbook 2nd ed. Robert E. Jones, MD, FACP, FACE, and Karmeen Kulkarni, MS, RD, CDE, BD-ADM, (Eds.). Buckboard Press, 2002

⁷ <http://www.diabetes.org/type-1-diabetes/kidney-disease.jsp>

⁸ Rossing P, Rossing K, Jacobson P, Parving HH: Unchanged incidence of diabetic nephropathy in IDDM patients. Diabetes 44 :739 –743,1995 [Abstract]

⁹ American Diabetes Association, Clinical Practice Recommendations. Diabetes Care 28:S4-S36, 2005

¹⁰ Utah Diabetes Management Handbook 2nd ed. Robert E. Jones, MD, FACP, FACE, and Karmeen Kulkarni, MS, RD, CDE, BD-ADM, (Eds.). Buckboard Press, 2002 p 20.3

¹¹ C Snively and C Gutierrez, Chronic Kidney Disease: Prevention and Treatment of Common Complications American Family Physician 70(10): online: <http://www.aafp.org/afp/004/1115/1921.html>

